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ABSTRACT

The effects of three experimental treatments on second and third grade, disadvantaged and nondisadvantaged children's choices between an immediate smaller and deferred larger reward were investigated in a 2 x 3 factorial design. In one condition, subjects were required to earn the larger reinforcement by working during the delay period. A second group received pretraining delay experience involving smaller rewards and shorter delay intervals than those of the final criterion choice. A control condition involved only the criterion choice. As expected, disadvantaged children made more nondelay decisions than middle class subjects on the criterion choice, and the multiple pretraining experience was most effective in overcoming this nondelay tendency. However, disadvantaged children were found to select a larger delayed reinforcement in situations involving a relatively short waiting period. These findings were related to social responsibilities, locus of control, and time perspective. Implications for compensatory education are discussed, and two subsequent investigations with disadvantaged populations are briefly described. (Authors)

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TRAINING OF PREFERENCE FOR DELAYED REINFORCEMENT IN DISADVANTAGED CHILDREN

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Voluntary delay of reinforcement, although extensively recognized as an important phenomenon has not been widely researched (Mischel & Staub, 1965). The few investigators who have focused upon the choice of larger delayed rewards versus smaller immediate ones have devoted their efforts largely to determination of cultural and cognitive influences. Positive relationships have been found between measures of voluntary delay of gratification and measures of home environment, self-control, social responsibility, achievement motivation, perceived probability of payoff, delay interval, time perspective, magnitude of the reinforcement, imitation learning, mental age, and internal locus of control (Mischel & Grusec, 1967; Bialer, 1961).

The basic paradigm typically employed in these studies involves a choice between a less valued object which can be obtained immediately and a more attractive one for which the individual must wait a specified period of time. For example, Mischel (1961) had Trinidadian children choose between a small candy bar at that time or a large candy bar for which waiting one week was required. He found that juvenile delinquents from that population showed greater preference for immediate, smaller reinforcement while more socially responsible children had developed "delay capacity."

These findings are consonant with those of other investigators and appear to relate to social learning theory (Rotter, 1954). Thus, if a child does not have opportunities to learn to defer reinforcement from the performance of his parents or significant others (Bandura & Mischel, 1965) or is not reinforced for doing so, he may not develop the "internal control" (Rotter, 1966) necessary to make the delay choice. Battle and Rotter (1963) report that persons from lower socioeconomic environments are more likely to view themselves as externally controlled entities (the pawns of fate or luck or other uncontrollable factors) rather than internally controlled (able to influence their own destinies). Accordingly, one might expect that children from disadvantaged home settings are less able to depend upon their environments and would be less willing to wait for a promised larger reward than would nondisadvantaged youth.

However, if such a relationship between socioeconomic status and delay capacity does exist, the description of that relationship should not constitute the terminal objective. It appears desirable to investigate methods by which those who would not normally choose to wait for a larger reward could be trained to do so. Bloom, Davis, and Hess (1965) state:

> Patterns of future-time orientation and striving for delayed, often symbolic, gratification are much more common among middle-class students than among disadvantaged students; these patterns are seen as necessary for successful academic performance. The motivational patterns of deprived children, particularly present-time orientation and reliance on immediate, often material, rewards are adaptive to their life circumstances though not facilitative in school. The research on motivation suggesta the need for developing school programs adapted to the motivational patterns of these youngsters or for developing methods which will alter these motivational and reward systems (p. 73).

In one study, which attempted to address this problem, Metzner (1963)

found that children are more likely to select a delayed reinforcement if they can work for it during the delay period rather than only wait. However, the "work" task consisted of constructing a building with a commercial plastic construction kit. This building task, which took three minutes, may have been considered as more of a play than a work activity by these first grade children. In contrast, Mischel and Staub (1965) report that larger reinforcements which can be attained only by waiting, are more often chosen than those requiring successful work, and this latter alternative is, in turn, more attractive than a contingency requiring both working and waiting.

A second strategy consisting of a series of experimental learning trials was successfully utilized by Buss (1963) to develop preference for delayed reinforcement in adolescents. The series consisted of four training trials involving small tasks and progressively longer delay intervals. In addition to development of the ability to delay gratification in that experimental situation, this newly established preference was found to generalize to another situation and another E.

When an animal is repeatedly exposed to similar discrimination problems or decision situations, the animal not only learns the specific attributes relevant to a given concept, but it also forms learning sets about how that general class of decisions is made (Harlow, 1949). The applicability of this learning-to-learn phenomenon to human Ss has also been demonstrated (Di Vesta & Walls, 1967a, 1967b, 1967c). Thus, if a child learns that, in general, the delay decision can be depended upon to yield greater reward value, he should come to select that general case.

The present study investigated the effects of certain of these variables

on voluntary delay of reinforcement. In particular, this experiment compared the learning set or multiple experiences (ME) strategy proposed by Buss (1963) with the instrumental work activity (IW) proposed by Metzner (1963), and, additionally, sought to determine how these strategies interact with culturally disadvantaged and nondisadvantaged children. It was assumed that middle class or nondisadvantaged Ss would tend to make more criterion delay decisions in a control condition (CC) than would disadvantaged children and accordingly, that the experimental manipulations (IW and ME) would be effective in overcoming such a nondelay tendency in the disadvantaged children.

However, the IW task for the present study was designed to be more similar to a traditional school work assignment than was the one used by Metzner (1963). It was therefore proposed that the IW condition could represent a less effective treatment than that used with Metzner's Ss and, possibly, than the ME condition of the present investigation. It was further assumed that delay capacity and socioeconomic condition should be related to social responsibility, locus of control, and time perspective.

Method

Design

The overall design consisted of three treatment conditions orthogonally crossed with two socioeconomic conditions in a 2 x 3 factorial investigation. The treatment conditions consisted of Instrumental Work (IW) Activity, Multiple Experience (ME) Training, and a Control Condition (CC) involving only the criterion choice. The two socioeconomic conditions were constituted by one group of children defined as culturally disadvantaged and a second group of middle class or nondisadvantaged Ss.

Subjects

The Ss were 90 second and third grade children, 46 females and 44 males from two public schools in West Virginia. Of these Ss, 45 were disadvantaged and 45 were classified as nondisadvantaged. An approximately equal number of disadvantaged and nondisadvantaged Ss was selected from any given classroom participating in the study. The criteria for selection of Ss for these two groups involved one or more of the following: (a) parents receiving welfare payments; (b) student receiving free breakfast and lunch; (c) student receiving free milk and vitamins; and (d) teacher knowledge of home conditions.

The Ss were assigned to the method of treatment by reference to a table of random numbers, with the restriction that the assignment to treatments was balanced (n=15) over the 45 Ss in each socioeconomic group.

Treatment Conditions

Instrumental Work Activity. Following five example frames, this group (IW) was required to work at a coding task for one minute. The task required Ss to draw with pencil the proper response symbol associated with a given stimulus number. The sample stimulus-response pairs were printed at the top of the page while only the stimulus (a number from 1-9) was provided below. These stimulus numbers were printed in random order above the response frames. For example, the stimulus 3 required the response /, and 8 required S to draw a + symbol. The number of S-R pairs that S was able to complete during the minute were counted orally by E. S was told that he had done well, as were Ss following all tasks, and was given the criterion choice, described below in the procedure section. Prior to making

this choice S was instructed that the larger reward could be "earned" by completing a work sheet identical to the one upon which he had worked, and by trading the completed work for the larger reward at the appointed time. Thus, the smaller reward could be taken immediately with no further instrumental activity; while the larger reinforcement required that the coding task (which could generally be finished in 15-20 minutes) be completed at some time during the delay interval.

Multiple Experience. Ss in the ME condition performed three tasks and were given three delay-nondelay choices. The first task required S to count aloud to 20. He was then given a choice between one M & M candy, "now, or nothing now and three M & M's if you will wait for one minute." As with all choices the instructions were repeated to be certain that the child understood the options. The S's choice was recorded, and he was given the opportunity to look at children's books while one minute passed. If he had choosen to delay he was given three candies at that time. If he did not choose to delay, he was shown the three candies and told that he now would have had them if he had choosen to wait.

The second ME choice situation was presented following a symbol coding task similar to that performed by the IW group. Marbles were laid on the table and a choice was made between one marble immediately or three marbles after three minutes. In order to control for color preference, a marble of the same color as the single marble was included in the group of three (Metzner, 1963). As with the first ME task, the waiting period was imposed regardless of the choice, and Ss who had not chosen to delay were shown the marbles that they could have obtained.

Following these two training experiences, Ss completed a child's jigsaw puzzle and were presented the criterion choice. Unlike the IW condition, no intervening activity was required of Ss who delayed in the ME or CC conditions.

Control. The control (CC) group Ss were asked to put together the same simple puzzle used in the ME treatment. Although no time limit was placed upon this task, no S needed more than five minutes to complete it. The criterion choice was then presented.

Procedure. Briefly, Ss participated in three tasks prior to the experimental manipulation. The first measure used was the Locus of Control Scale for Children (Bialer, 1961). The Scale consists of 23 "yes-no" items; for example, "Can you do anything about what is going to happen tomorrow?"

A second measure was adapted from Harris' (1957) Scale for Social Responsibility in Children. Mischel (1961) constructed a shorter form of the responsibility scale consisting of items, 1, 2, 3, 7, 11, 17, 19, 23, 24, 27, 28, 29, 31, 32, 40, 43, 44, and 48 from the Harris 50 item instrument. Some of these 18 items were reworded slightly to facilitate comprehension by the younger Ss of the present study. An example of these statements is, "At school, it is easy to find things to do when the teacher doesn't give us enough work." The items for the Locus of Control Scale and the Scale for Social Responsibility were read aloud by E to the Ss as a group.

Following this initial group session, Ss were seated individually beside E at a small table in an experimental room for a third measure, Time Perspective (Spivack, Levine, & Sprigle, 1959). For this measure, S was instructed to

hold up his hand when he thought that one minute had passed, and the number of seconds which had elapsed prior to the response was recorded. This was followed by one of the experimental treatment conditions (IW, ME, or CC) and the criterion choice for each S.

The criterion decision required a choice between five pennies, which could be secured immediately, and seven pennies, after a delay of four days. The instructions, adapted from Bialer (1961), first congratulated the child for his performance and then described the two possible alternatives. After then counting out the five and seven cent amounts in two separate lines on the table, E pointed to the appropriate line of pennies and further instructed, "You can have these five pennies now, or nothing now, and these seven pennies next Friday (appropriate day of the week) morning when you come to your room." If the appropriate day was Saturday or Sunday, the terminal day was extended to Monday. "Which do you want, these now, or these Friday?" E then drew her hands away from the pennies and recorded S's choice.

Results

The numbers of criterion delay and nondelay selections for the six experimental conditions are presented in Table 1. An overall chi-square of immediate and delay choices for the six groups was significant (χ^2 = 12.83, df = 5, $p < .05$). However, the hypotheses are more adequately tested by individual comparisons.

A primary assumption was that nondisadvantaged Ss should make more delay selections than should disadvantaged children. Comparison of selections

by these two socioeconomic groups in the CC condition yielded $\underline{X}^2 = 8.56$ ($\underline{df} = 1$, $\underline{p} < .01$). Thus, this hypothesis was supported; however, an interesting and perhaps more important analysis was a test of the first ME choice compared to the CC criterion choice, both for disadvantaged children. A $\underline{X}^2 = 8.56$ ($\underline{df} = 1$, $\underline{p} < .01$) indicates that disadvantaged children cannot categorically be termed "nondelayers." These S's were willing to wait for one minute to receive three pieces of candy as opposed to one immediately, but without pretraining experiences they were not willing to wait four days for seven pennies as opposed to five. In addition these Ss also delayed in the second ME task to receive three marbles rather than one.

The second hypothesis involving the effectiveness of the experimental manipulations was also supported. The chi-square analysis for criterion choices of the disadvantaged group in CC and ME conditions yielded a significant effect ($\underline{X}^2 = 8.56$, $\underline{df} = 1$, $\underline{p} < .01$).

Although these data were in the predicted direction for the IW conditions (see Table 1), as anticipated, IW was not as effective as ME in overcoming the nondelay tendency of this group. Thus, for disadvantaged Ss the number of delay criterion choices was not significantly different for CC and IW groups ($\underline{p} > .05$). Additional multiple comparisons yielded differences in selection response for the disadvantaged CC group versus the nondisadvantaged ME and IW groups ($\underline{X}^2 = 5.00$, $\underline{df} = 1$, $\underline{p} < .05$ in each case).

Additional analyses were performed to clarify the relationship among the preexperimental measures and to relate them to delay capacity. A one-way analysis of variance comparing Social Responsibility Scores across the socioeconomic variable was significant ($\underline{F} = 7.89$, $\underline{df} = 1.88$, $\underline{p} < .01$) indicating

that nondisadvantaged Ss gave more socially approved responses to the items. Similar tests for the effects of Locus of Control and Time Perspective were nonsignificant ($p > .05$).

Significant positive correlations were obtained between the measure of Time Perspective and Internal Locus of Control ($r = .34$, $df = 88$, $p < .01$), between Internal Locus of Control and Choice, or number of pennies chosen in the criterion decision (r p.bis. $= .21$, $df = 88$, $p < .05$), between Time Perspective and Choice for male Ss (r p.bis. $= .31$, $df = 42$, $p < .05$), and between Social Responsibility and Choice for all Ss in CC (r p.bis. $= .44$, $df = 28$, $p < .05$). Overall correlations between preexperimental measure and criterion choice are probably attenuated in the present study by the confounding influence of the experimental treatments.

Discussion

The findings may be summarized as follows. When decision situations are constructed according to the conventional voluntary delay of reinforcement format, children from disadvantaged home environments typically do not defer immediate, less valued rewards for the sake of obtaining a more valuable reward after a substantial waiting period. However, this relationship appears to break down as the delay interval is lessened and/or the ratio of the magnitude of larger delayed reward to the immediately available smaller positive outcome is increased. In contrast, nondisadvantaged children were found to be more "socially responsible" and tended to delay for a larger reinforcement in all of the situations of the present investigation. Correlates of this tendency to postpone gratification include social responsibility, time perspective, and internal locus of control.

The results are consistent with the findings of Bialer (1961) who studied the relationship of delay decisions and locus of control. In that investigation, a factor analysis isolated a separate age-independent dimension which included these two variables. Thus, internally controlled children generally perceive their own waiting behavior as instrumental in earning the more valued payoff.

This tendency for the internally controlled S to delay appears to be closely related to his perception of the length of time that he will have to wait. Several authors have reported that Ss who defer reinforcement exhibit more accurate perspective of time (Mischel & Metzner, 1962; Mischel, 1961; Spivack, Levine & Sprigle, 1959), and the present results support those findings.

The principle effects on delay learning and transfer were due to the ME manipulation of choice opportunities for disadvantaged Ss. Although the IW and ME conditions did not differ significantly, differential effects were obtained when these groups were compared to CC. Although the "work" activity employed by Metzner (1963) appears more effective in overcoming the predelection for immediate reward than a similar condition in the present investigation, children in that study may have viewed the construction task as a play activity and, as such, an additional reinforcement.

The performance of disadvantaged children in the ME condition demonstrated the effectiveness of this approach for training delay and compares favorably with classical examples of learning-to-learn (Harlow, 1949). Shepard (1957) found that young children can apprehend the associative characteristics common to a general problem class and form learning sets rapidly. Thus, Ss in the ME condition may learn that the general problem class is best solved by the delay response.

In contrast, an account may also be made for these findings by negative adaptation (Guthrie, 1952) and by fading (Skinner, 1968). The series of choices which involves progressively increasing delay periods, constitute a gradual approximation of the desired end. Although short delays may be tolerated, the disadvantaged individual, ostensibly, learns from experiences within his environment, a generalized habit which precludes waiting relatively long periods for desired outcomes. Success experiences incorporating gradually lengthened delay periods may be of practical utility in overcoming this tendency. For example, if an individual experiences reinforcing outcomes in situations involving delays of an hour, a day, a week, and a month, respectively, he may develop and display willingness to pursue a distant academic goal or enroll in a vocational training program. Such hypotheses should be tested in future investigations.

The experiment described herein does not provide a critical test of the possible influence of awareness by Ss of experimental demand characteristics (Orne, 1962) associated with the tasks. An S in the ME condition may have had increased opportunity to formulate hypotheses concerning the purposes of the experiment and adjust his intent accordingly (Dulany, 1962).

In general, the effects in the present study tend to argue for non-specific transfer of a generalized problem solving behavior to similar choice situations. With a sufficient number of training problems it is probably that even stronger effects would be obtained. Thus, longitudinal studies of infant, childhood and adult intervention strategies could well provide ideal situations for further testing the effects of multiple delay experiences in overcoming the cyclical influence of cultural deprivation.

Since the collection of these data, two additional studies with disadvantaged populations have been completed. One investigation was designed to test posited differences between the tendency to delay reinforcement for traditional Vocational Rehabilitation Clients (DVR) and Work Incentive Welfare Clients (WIN). Rehabilitation (DVR) Ss, unanimously selected deferred reward and were willing to delay twice as long as WIN clients (means of 2.0 and 1.0 months, respectively) for larger monetary payoffs (Walls & Miller, 1970).

A second experiment attempted to influence the delay-nondelay decisions of clients. As an ostensibly incidental portion of the procedure, Ss were allowed to see one of four video tapes, in which a high status counselor or a medium status client modeled the required assembly task and either a delay or a nondelay decision. Clients strongly tended to imitate the decision of the video tape model (both high and medium status) to which he was exposed (Walls & Smith, 1970).

Thus, two strategies for modifying the decision making process seem to recommend further exploration within this paradigm. While the imitation or modeling procedure appears to be of greater situational utility, learning sets formed through appropriate pretraining are considered to operate, through nonspecific transfer, to facilitate longer lasting, more generalizable decision processes. However, the duration and generality of these effects should be explored in future investigations.

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Footnote:

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Table 1

Number of Delay and Nondelay Criterion Choices

for Three Experimental Conditions

	Instrumental (IW)	Experience (ME)	Control (CC)
Disadvantaged			
Delay	7	11	3
Nondelay	8	4	12
Nondisadvantaged			
Delay	8	10	11
Nondelay	7	5	4